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Key technologies for present and future optical networks

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In less than forty years, optical fiber has become omnipresent to convey high volumes of information over long distances for any segment of transport network.
Short reach access networks are now boosted by the advent of 10Gigabit Ethernet standards, Fiber-To-The-Home and Passive Optical Networks technologies.
Longer reach (from a few hundreds up to a few thousands of kilometers), terrestrial metropolitan and backbone networks have become translucent, based on the ability of lightpaths to traverse some Wavelength-Selective-Switch-based nodes without optoelectronic processing while being redirected depending on their wavelength; besides, those wavelength-multiplexed networks are about to become dynamically reconfigurable and very soon to transport capacities as high as 10 Terabit/s on a single fiber, using up to 100Gigabit/s optoelectronic transponders most likely based on Coherent Detection assisted by Digital Signal Processing.
Eventually, submarine systems are expected to propose multi-terabit/s capacities over transoceanic distances.
Such evolutions all aim at coping with the ever-increasing demand while lowering the cost and consumption of a transported bit.
This paper draws an overview of the most recent evolutions and prospects for optical networks and the key associated technologies

Author: Dr ANTONA, Jean-Christophe (Alcatel-Lucent)

Presenter: Dr ANTONA, Jean-Christophe (Alcatel-Lucent)

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